REPORT

OF

EARHART SEARCH

LEXINGTON GROUP

U. S. S. LEXINGTON

FLAGSHIP

JULY, 1937

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Lexington Group,
U.S.S. Lexington, Flagship,
Enroute Hawaiian Area,
20 July 1937.

From: Commander Lexington Group.
To : The Commandant, Fourteenth Naval District.

Subject: Report of Earhart Search, forwarding.

Enclosures:
(A) Annex "A", Estimate and Decision, Comdesron Two.
(B) Annex "B", Narrative of Search, Lexington Group.
(C) Annex "C"; Aerological Data.
(D) Annex "D", Lexington Report of Earhart Search Operations.
(E) Appendix "A", Chart Photostat - Earhart Flight Information.
(F) Appendix "B", Chart Photostat - Tract Chart Earhart Search, U.S.S. Lexington and attached aircraft.
(G) Appendix "C", Chart Photostat - The Earhart Search (Showing tracks of all vessels participating).
(H) Appendix "D" - Photostats - Search Plan #1, and #2.
(I) Appendix "E" - Earhart Search Plotting Sheet.

1. Annexes and appendices are submitted herewith as forming as complete a report as possible on operations of the Lexington group, consisting of Lexington with Aircraft Squadrons VS-2, VS-3, VS-4, VS-41, VT-2 and VB-4 embarked, of Commander Destroyer Division Three in Drayton, and Lamson and Cushing, during the period 4 to 18 July, 1937, inclusive, and of search operations of the U.S.S. Swan and U.S.C.G. Itasca while serving under Commander Lexington Group during the period 11-18 July 1937.

2. An effort has been made to confine the substance of this report to matters of fact rather than opinion.

3. Track chart tracings are being forwarded under separate cover.

4. The performance of duty by all units concerned was excellent.

The expeditious and efficient services rendered by the Fourteenth Naval District, the Fleet Air Base, Commander Minecraft, and Commander Submarine Squadron Six in preparation for the search operations, are greatly appreciated.

J. S. Dowell

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ESTIMATE AND DECISIONS

EARHART SEARCH

I. MISSION:

To make the most effective search possible in order to locate Earhart plane, or rubber boat, and personnel.

II INFORMATION:

NOTE: All times used herein are Greenwich Civil.

1. KNOWN FACTS:

1. That Standard Lockheed Electra-low wing land monoplane, No. X-16020, took off from Lae, New Guinea, latitude 144° 55' E, longitude 6° 45' S at 0000 GCT-2 July, 1937, bound for Howland Island, latitude 0° 50' N, longitude 176° 41' W. Pilot: Amelia Earhart Putnam; navigator: Fred Noonan, expecting to arrive in 18 hours.

2. That the plane's color was dural, with orange trim.

3. That a two man rubber life boat, life belts, flares and emergency water and rations were carried.

4. Rubber boat had a pair of oars and could be kept afloat by patching material and hand pump.

5. That the plane was equipped with radio capable of transmission and reception on 500 KCS, 3105 KCS, and 6210 KCS; assigned call letters "KHAQQ."

6. That the take-off from Lae was delayed awaiting a time tick and repairing broken fuel line.

7. That the plane was equipped with an orange box kite to be flown as distress signal, and by means of which an emergency antenna might be carried to a moderate height.

8. That the distance from Lae to Howland is 2227 nautical miles.

9. That the plane was filled with 1100 gallons of gasoline prior to departure.

10. That the plane's economical air speed was 130 knots.

11. That it's range in still air at this speed, with optimum carburetor adjustment was 3120 nautical miles, or an endurance of 24 hours at 45.8 gallons per hour.

12. That the plane's range in still air at 53 gallons per hour for 20.5 hours was 2719 nautical miles.

13. That the distance covered at average ground speed 105 knots in 20.5 hours would be 2152 nautical miles.

14. That the distance covered at average ground speed 120 knots in 20.5 hours would be 2460 nautical miles.

15. That the plane's position at 0720 GCT was given as 4° 33' S, 159° 06' east, putting it on it's course at 111 knots ground speed. This was the only complete position report received.

16. That the following weather forecast was received by the navigator prior departure Lae: "Lae to 165° E: winds ESE 12-15; 165° to 175°: ENE 18; 175° E to Howland; ENE 15 and squalls to be detoured."

17. That the following messages were received from the plane:

0720, to Lae: Position report lat. 04-33.5 S, long. 159° 07' W.
1030 Nauru Island heard "A ship in sight ahead."
1418 Itasca began receiving incomplete messages on agreed schedules. No answers to questions put to Earhart. No positions given. No success in attempted radio bearings by Itasca, and no apparent success by Earhart.
1745 "200 miles out."
1816 "100 miles out, coming up (fast)."
1912 "one-half hour fuel and no landfall (position doubtful)."
1928 "Circling trying to pick up Island."
2013 "Line of position 157-337" (no reference point given).
2025 "157-337 heading north and south"

18. That the Ontario was stationed in latitude 3° S, longitude 145° E.

19. That the SS Myrtlebank was in approximate latitude 1° 40' S, longitude 166° 45' E.

20. That the Itasca was stationed immediately to north-eastward of Howland.

21. That morning of 2 July Itasca was laying a heavy smoke screen which hung for hours.

22. That the strength of radio signals in Itasca was greatest at 1928.

23. GCT sunrise, Howland, on 2 July was 1745.

24. That the plane would float with empty gas tanks, if undamaged.

25. That the plane's normal radio power supply was so located that it could not have been used with plane on the water.

26. Morning of 2 July visibility to south of Howland was excellent. Heavy clouds were about 20 miles northwest. Surface winds ENE 6, shifting to ESE 16.

B. PROBABILITIES ARISING FROM RUMOR OR REASONABLE ASSUMPTIONS

1. That the plane was equipped with an emergency radio set that could be operated from battery power supply.

2. That life saving equipment was stowed in the tail.

3. That the color of the lifeboat was yellow.

4. That the plane had one side door and no escape hatch in top.

5. That gasoline storage was in tanks in the passenger compartment, and that gasoline was pumped by hand to two 50 gallon gravity tanks in the wings.

6. That the following summarized weather forecast, received at Lae, as the plane was taking off, and later transmitted to the plane three times, was received: "Accurate forecast difficult account lack of reports; conditions average - no major storms; dangerous local rain squalls 300 miles east of Lae and scattered heavy showers remainder of route; winds ESE 25 to Ontario then E to ENE 20 to Howland."

7. That the following weather conditions were encountered in flight:

(a) Ontario ENE force 3 (0700 GCT) SE force 3 (1900 GCT).

(b) Howland Island (2300 GCT 1st (pre-start)

0	ENE 14	3000	ENE 24	6000	ENE 30
1000	ENE 18	4000	ENE 26	7000	ENE 30
2000	ENE 19	5000	ENE 30	8000	ENE 31

8. That the altitude at which the plane flew would have depended upon weather conditions and the desire to estimate drift or pick up a landfall, and cannot be judged.

9. That the navigator was competent and experienced.

10. That at about 1030 the plane passed the Ontario giving a ground speed of 106 or the Myrtlebank giving a ground speed of 118 knots.

11. That at 1928 the plane passed closest to the Itasca and within 100 miles, after a run of 2050 to 2350 miles.

12. That at 53 gallons per hour the plane made 140 knots in still air.

13. That the plane landed on an uncharted reef or island, or on the water, within 300 miles of Howland.

14. That the plane would float with engines nearly submerged, with wings nearly submerged, with fuselage partly submerged, and with tail surfaces out of the water.

15. That the Itasca first reported to Howland by semaphore that plane was NW of island and had evidently missed it (see gestae).

16. That at 2030 the plane landed northwest of Howland.

C. CONDITIONS DETERMINED FROM SAILING DIRECTIONS OR BY EXPERIENCE:

1. That the prevailing winds are easterly, 10 knots.

2. That the average current in the area to north and west of Howland Island is northwest, ½ knot (experienced by Lexington).

3. That the current in the vicinity of Baker Island is westerly, about 20 miles per day.

4. That the current in the southern Gilberts is southwesterly about 1½ knots.

5. That the current in the middle Gilberts is westerly, about 2 knots.

6. That the current in the northern Gilberts is northwesterly, about 1½ knots.

7. That about latitude 4° north is the boundary between the southern equatorial current, flowing westerly, and the counter-equatorial current, which begins to form near the Gilberts, flowing easterly.

8. That along this boundary there are apt to be circular currents and areas in which floating objects would accumulate.

9. That with the plane nearly submerged and tailing with the wind, the wind resistance would be small and the underwater drag great, so that the current effect would be great.

10. That the currents given by the sailing directions were compiled from data obtained largely by sailing mariners, and the wind effect, included in current estimates by all mariners, would hence be fully accounted for by this data.

11. That a rubber boat would be most greatly affected in its drift by the surface wind, regardless of water current.

12. That with a rubber boat, the chances of rowing across wind sufficiently to make land would be excellent for a boat starting 100 miles or more to the eastward of the Gilberts, provided navigational equipment was available.

D. POSSIBILITIES ARISING FROM RUMOR AND REPORTS:

1. On 3 July plane gave distress call and gave position 1.6 and 179, north or south and east or west unreported. Coast Guard San Francisco Headquarters give credibility to this report.

2. That the plane was down on water north of Howland as indicated by radio test arranged through station KGMB.

3. On 3 July plane reported down 225 miles NNW Howland and said something about "Putnam ---- fly kite."

4. HMS Achilles on 3 July heard dashes made by transmitter other that Itasca's in response to request by Itasca for dashes.

5. Radio bearings, 4 July:

   Nokapu 213° 10° (very doubtful)
   Woke 144° 10° (doubtful. passes through Tutuila, Samoa.
   Howland 347° true (approximate).

6. Rocksprings, Wyoming, reported plane on a roof, southeast of Howland Island.

7. Extremely doubtful report "281 north Howland drifting northwest" whether miles or degrees, and whether plane with relation to Howland or vice versa not known (6 July).

8. Report from Melbourne signed "Kirkby" "Plane between Howland Samoa group ten hours west" (8 July).

9. Freitas of Yreka reported Mrs. Putnam's voice saying "Plane on reef 200 miles directly south of Howland, both okay, one wing broken" (8 July late).

10. Mrs. Noonan stated Noonan would turn back if in doubt.

11. Additional reported positions: 176° and 1°.d; 213 miles WNW; 173 W - 5 S Island Jonus in vicinity, also island nameless on course further north 171 W 3 S (9 July).

12. George Palmer Putnam requested on 15 July search of 170° E, 0° 9' north, evidently reasoned for 2 knots drift from Howland due west.

III EARHART PLANE'S MISSION: To land safely on Howland Island before exhaustion of fuel supply.

IV COURSES OF ACTION OPEN TO EARHART PLANE:

A. ALTITUDE:

1. To fly close to the water in order to take advantage of reduced headwinds and to obtain frequent drift observations and correct course accordingly.

2. To fly at a moderate altitude, descending as necessary to sight station ships and landfalls.

3. To fly at high altitudes, correcting course by frequent celestial observations, to increase fuel economy.

Number 3 is the most likely method.

B. COURSE:

1. To correct course according to drift observations at low altitude.

2. To head to southward of course as far as longitude 165° E, then to head for objective in accordance with weather forecast received.

3. To deliberately over-correct to southward with the intention of running up a morning longitude line of position through the objective.

4. To deliberately over-correct to northward with the intention of running down a morning longitude line of position through the objective.

In view of the difficulty in sighting Howland toward the eastward in early morning, of which Noonan must have been well aware, it seems most probable that he took either the course of action specified in 3 or in 4 above. Of these the former had the advantage of bringing the plane close to the Phoenix group in case of early shortage of gas, but the disadvantage of winding up over the open sea if Howland was missed. The latter had the advantage of bringing the plane over the Phoenix group if Howland was missed, but the disadvantage of being over the open sea in case of premature gas shortage.

The following indications point to adoption of the former course:

1. The plane was evidently in position to obtain observations during the early morning.

2. Visibility to the southward was excellent and the Itasca's smoke plume could have been seen 40 miles or more, whereas heavy clouds lay to the northward.

3. The Itasca's first estimate of position was northeast.

3. SPEED

1. To run at speed higher than the economical speed, 130 knots, in order to arrive expeditiously and reduce the chances of bad judgement induced by fatigue.

2. To run at the economical speed, 130 knots, to provide a maximum factor of safety.

3. To run below the economical speed in order not to approach the objective until well after sunrise.

Of these, the second is considered far the most probable.

The plane evidently turned between 1900 and 1930 and at 110 knots these times would give runs of 2090 and 2145 nautical miles along the course - somewhat short of objective.

II. MOST PROBABLE ACTION OF PLANE

It is most probable that:

1. The plane cruised at economical speed at a moderate altitude laying course between Howland and the Phoenix Islands.

2. That navigational fixes were reasonable frequent but somewhat in error.

3. That radio bearings were inaccurate or impossible due to atmospherics and to the recognized inherent limitations of high frequency direction finders.

4. That the plane's gas supply was slightly diminished either by a leak or by non-economical adjustment of the carburetor.

5. That headwinds stronger than expected were experienced.

6. That at about 1900, while somewhat short of its objective, the plane turned and headed northward on a line of position run forward from celestial observation about 1700, passing nearest Howland Island at 1928 after a 65 mile run, and, at about this time, began to circle looking for the island.

7. That at about 2000 the pilot announced the direction but not the reference point for a line of position she was running on, evidently believing it to run through the island, and began running north and south across this line near the point at which her navigator believed the island to be.

8. That at about 2030 the plane landed on the sea to the northwest of Howland Island, within 120 miles of the Island.

VI OTHER COURSES OF ACTION OF PLANE:

It is possible also that:

1. The plane flew beyond the Island.

2. The plane headed south past the Island.

3. The plane landed on a reef or island either charted or uncharted.

TOTAL REASONABLE AREA IN WHICH PLANE MIGHT BE

DATE	PROBABLE	MOST PROBABLE
2 July	360,000 Sq. Mi.	57,600 Sq.Mi.
13 July	720,000 " "	163,200 " "
18 July	864,000 " "	211,200 " "

VII OWN LIMITATIONS:

1. Number limitations:

Available: Carrier Group, Swan and Itasca. (Colorado ordered detached immediately upon our arrival.

2. Fuel limitations:

Set by Navy Department. The Lexington is the controlling factor, as it was directed she should return to San Diego from search area without refueling. This necessarily limits her speed and that of the entire Earhart Search Group, as the plane guards Drayton, Lamson and Cushing and the Swan and Itasca will have to fuel from her if they do not practice strict fuel economy.

3. Area per day possible consistently under fuel limitations:

(a) Carrier Group 28,800 square miles.

(b) Itasca (assuming 10 mile front) 1320 square miles.

(c) Swan (assuming 10 mile front) 1000 square miles.

4. Total number of days possible:

(a) Carrier Group 13th to 19th - seven (201,600 sq.mi).

(b) Itasca 11th to 17th - seven (9,240 sq.mi).

(c) Swan 11th to 20th - ten (10,000 sq.mi).

5. Total number of square miles under imposed limitations 220,840.

6. Weather limitations: Frequent squalls which reduce visibility and at times make carrier aircraft operations over-hazardous.

VIII ASSUMPTIONS:

1. That the plane landed on water or on an uncharted reef within 120 miles of the most probable landing point, 23 miles northwest of Howland Island.

2. That, if on the water, the plane drifted between the limits northwest 3/4 knot and due west 1½ knots.

IX COURSES OF ACTION OPEN TO US:

1. To systematically search the most probable area in a westerly direction so as to overtake a drifting plane, and so fit our potential search area as to best cover this area, considering its southern sector as having been adequately covered by Colorado and her aircraft and by Itasca and Swan.

2. To cover the most probable area including its southern sector, considering earlier search to the southward ineffective, and thus necessarily sacrifice some of the northerly or westerly area.

3. To search to the best of our ability the widely separated and remote areas mentioned in many conflicting reports.

X DECISION:

To make the most effective possible search with all available forces by:

1. Requesting that Colorado complete search to southeastward, including Phoenix group, prior 11 July, then fuel destroyers on 12 July;

2. Using Swan and Itasca for westward sweep, including thorough search of Gilbert group and maximum probable drift limit;

3. Using Lexington group to its maximum sustained capacity for an intensive search from east to west covering the above defined most probable area except the southeastern sector;

in order to locate the Earhart plane, or rubber boat, and personnel.

NARRATIVE OF EARHART SEARCH

1. PREPARATION:

At about noon, 3 July, the Navy Department directed the Commander-in-Chief, U. S. Fleet, to hold an aircraft carrier in readiness, to have it fuel, and to make all necessary preparations for proceeding to the vicinity of Howland Island for the purpose of conducting a thorough search for Mrs. Amelia Earhart Putnam, her navigator Captain Fred Noonan, and the expensive laboratory-equipped plane.

In turn the Commander-in-Chief directed Commander Aircraft, Battle Force, to detail an aircraft carrier for this duty and to have it ready to proceed on four hours notice.

Commander Aircraft, Battle Force detailed the carrier Lexington, plus the scouting squadrons of carriers, and advised the Lexington, Rigel and Naval Air Station at North Island to make the necessary preparations. The Lexington left Santa Barbara at 4:00 p.m., 3 July and arrived at San Diego at 11:00 p.m., of the same date.

The evening of 3 July, the Navy Department directed the Commander-in-Chief to assign four long range destroyers to accompany the Lexington. At 10:00 p.m., 3 July, the Chief of Staff, Destroyers Scouting Force, called a conference of commanding officers on board the Whitney to determine which vessels were best suited for the search duty. Commander Scouting Force nominated the destroyers Lamson, Drayton, Hull and Worden. A short time later Commander Destroyers, Scouting Force recommended the substitution of the Cushing and Perkins in place of the Hull and Worden, in order to prevent the interruption of force gunnery schools. The Cushing and Perkins were then enroute from the Puget Sound area to San Diego to join the squadron. The Cushing and Perkins were officially detailed for this duty and were directed by Commander Destroyers, Scouting Force to put in at San Pedro, fuel and provision to capacity and to await orders. A short time later the Cushing and Perkins were directed by Commander Destroyers, Scouting Force to proceed, upon completion of fueling and provisioning, and join Commander Destroyer Squadron Two in Lamson off Coronado Beach.

Upon notification that four destroyers would be required to accompany the Lexington, and when it was determined which destroyers would leave, an effort was made to recall the crews. The Lamson's crew was on board in view of the fact that she had the ready duty. Many of the Drayton's crew were missing and could not be located. Commander Destroyers, Scouting Force supplied the necessary signalmen and radiomen. However, the Drayton sailed about 40 men short of her allowance, mostly in seamen and firemen ratings.

The Lexington left San Pedro for Coronado Roads at 8:46 a.m., 4 July, and arrived at 10:47 a.m.

In the forenoon of 4 July, the Commander-in-Chief directed Commander Destroyer Squadron Two to take command of the Lexington Group, consisting of the Lexington, Lamson, Drayton, Perkins and Cushing, and, when in all respects ready, to proceed to assist in Earhart search, cooperating with Commandant Fourteenth Naval District, the Colorado and Itasca.

At 11:45 a.m., 4 July, Commander Destroyer Squadron Two in Lamson and the Drayton met the Lexington in Coronado Roads. Commander Destroyer Squadron Two shifted his broad command pennant to the Lexington and assumed command of the Lexington Group.

Orders were then issued by Commander Destroyer Squadron Two to Cushing and Perkins to report when ready and proceed via shortest route to rendezvous with Lexington Group.

By orders of the Commander-in-Chief, Mr. Paul Brock, representing the International News Service, came on board.

At 1300 4 July, the Drayton and Lamson got underway from Coronado Roads for rendezvous, and the Lexington to take aboard 60 planes from North Island. The Southard and Chandler were acting as plane guards. A total of 63 officers and 311 enlisted men were received aboard the Lexington from North Island, sixty planes landed safely, but two were unable to get their hooks down and were directed to return to North Island, complete repairs and return to the Lexington. They landed at North Island at 1445, completed repairs and returned to the Lexington at 1530.

The two destroyers acting as plane guard were released at 1530. The Chandler was recalled at 1550 in order to transport Lieutenant (jg) George Leland to San Diego for treatment at the Naval Hospital. He had become seriously ill with gastric ulcer.

At 1500 Cushing and Perkins reported ready and were authorized to make 28 knots in joining up. Enroute, the Perkins, at 1730, 4 July, developed serious vibrations in the port high pressure turbine, and reported that she was unable to exceed 17 knots. She was directed by Commander Destroyer Squadron Two to proceed to San Diego and go alongside the Whitney for necessary repairs.

At 1910 Commander Destroyer Squadron Two in Lexington, Commander Destroyer Division Three in Drayton, Lamson and Cushing rendezvoused ten miles south of China Point, San Clemente, and departed for Lahaina Roads, speed 23 knots. The Cushing was temporarily assigned to Destroyer Division Three for tactical purposes.

Commander Aircraft, Battle Force requested that the Lexington be fueled at Lahaina, and the Commander-in-Chief so directed.

At 1910 4 July, Commander Destroyer Squadron Two advised the Commandant Fourteenth Naval District that the Lexington Group was proceeding to fuel at Lahaina Roads. At 2135 information was received from Commandant Fourteenth Naval District that one oil barge of 155,000 gallon capacity was the only means for delivering fuel at Lahaina Roads. During the night of 4-5 July Commander Destroyer Squadron Two ascertained that the U.S.S. Ramapo was enroute to Guam, Marianas Islands. Her position was determined from weather reports. It was also determined that by changing her course within a few hours for Lahaina Roads she would arrive simultaneously with the Lexington. At 0940 5 July, Commander Destroyer Squadron Two requested of the Commander-in-Chief by priority despatch the practicability of the Ramapo operating temporarily with the Lexington Group for fueling. The Commander-in-Chief conferred with Commander Base Force and was advised that the scheme seemed practicable but that the Ramapo was operating directly under the Chief of Naval Operations and the Commander-in-Chief, Asiatic Fleet. The Commander-in-Chief, U. S. Fleet, requested the Chief of Naval Operations to assign the Ramapo to this duty and also requested that a reply be sent direct to Commander Destroyer Squadron Two (See CINCUS 0005-1310 of July). During the day the feasibility of using destroyers to transport fuel to the Lexington was considered. This was found to be impracticable because of slow pumping rate of destroyers, the small hoses available, impossibility of Lexington taking suction with her pumps and the necessity for at least three trips for each destroyer. (Destroyers' fuel capacity is 143,000 gallons each, estimated pumping rate 5,000 gallons per hour). At 1839 no reply having been received from the Chief of Naval Operations relative to the Ramapo, and in view of the urgency of the situation and the necessity for the Ramapo receiving immediate orders, Radio Washington was asked by priority operator's signal to advise time of delivery of CINCUS despatch 0005-1310 to Chief of Naval Operations. Reply was then received to the effect that action would be taken at the beginning of office hours Tuesday. After an exchange of messages with the Commandant Fourteenth Naval District, it was determined that, as a last resort, it would be feasible to take the Lexington into Pearl Harbor for fueling provided there was no appreciable wind. However, this was not considered prudent until completion of further contemplated dredging.

At 0945 6 July (Washington time) the Ramapo was issued the necessary orders to proceed to Lahaina Roads for the purpose of fueling the Lexington, replenish fuel thus delivered from supply at Pearl Harbor, and then proceed to Guam.

Tuesday night 6 July, provision and stores orders for Lexington and accompanying destroyers were summarized and sent by despatch to Commandant Fourteenth Naval District. Motion pictures were requested for the destroyers, who had left on too short notice to take care of this detail, but none were available at Pearl Harbor.

Arrangements were made with the Commandant, Fourteenth Naval District to have the Lexington proceed to Lahaina Roads, await the arrival of the Ramapo; fuel from her, and leave as soon thereafter as practicable, and for destroyers Drayton, Lamson and Cushing to proceed to Pearl Harbor for fueling and provisioning, and to take on provisions and stores for the Lexington. A conference with the Commandant was requested for Thursday afternoon. The Lexington arrived at Lahaina Roads at 1146 8 July. The Lexington Group made good 23½ knots during passage Coronado Roads to Lahaina.

Commander Destroyer Division Three with the destroyers was directed at 0800 to proceed independently and arrived at Pearl Harbor at 1430 8 July. Destroyers fueled and provisioned to capacity. The Drayton received 97,938 gallons of fuel, the Lamson 93,836 and the Cushing 96,693. Approximately seven tons of stores were divided among the three destroyers for delivery to the Lexington at Lahaina Roads.

At 12:10 p.m., 8 July, the Avocet went alongside Lexington for the purpose of delivering 10,000 gallons of aviation gasoline and some necessary aircraft engine spares from the Fleet Air Base, Pearl Harbor.

Previous arrangements having been made, immediately upon arrival of the Lexington at Lahaina, Commander Destroyer Squadron Two, the Commanding Officer of the Lexington and two officer assistants embarked in patrol plane furnished by the Fleet Air Base and proceeded to Pearl Harbor for conference with Commandant Fourteenth Naval District. The conference was also attended by Commander Destroyer Division Three, Commander Minecraft, Battle Force, and the Commanding Officer of the Fleet Air Base, Pearl Harbor. Information relative to the search was obtained and instructions were received. Commander Destroyer Squadron Two embarked at 1800 in Lamson for passage to Lahaina Roads.

At 1830 8 July, the Lamson and Drayton completed fueling and left Pearl Harbor for Lahaina. The Cushing remained at Pearl Harbor in order to complete minor voyage repairs. While at Pearl Harbor, the Commandant Fourteenth Naval District ordered 20 seamen, 20 firemen and 1 chief pharmacist's mate transferred to the Drayton for temporary duty during search operations.

At 2000 8 July, the Cushing left Pearl Harbor for Lahaina.

At 0100 9 July, the Drayton and Lamson, with Commander Destroyer Squadron Two and staff embarked, arrived at Lahaina, and Commander Destroyer Squadron Two and staff reembarked in Lexington. At 0300, Cushing arrived Lahaina Roads.

At 0638 9 July the Ramapo arrived, and fueling of the Lexington was commenced immediately.

At 0630 Lexington took aboard stores from destroyers. At the same time she exchanged movie programs with the destroyers.

By authority of the Bureau of Navigation, Mr. Earl M. Wolty, of the Associated Press and Mr. Charles Mounce, of the United Press embarked in Lexington.

At 1000 conference of Commander Destroyer Squadron Two, Commander Destroyer Division Three, destroyer commanding officers and communication officers, and the aircraft department of the Lexington was held in the Lexington.

At 1030 the Commanding Officer of the Lexington and officer assistant returned from Pearl Harbor by patrol plane.

At 1145 9 July, the destroyers Drayton, Lamson and Cushing got underway for the purpose of calibrating direction finders in Lahaina Roads, while the Lexington transmitted on 725 KCS: times of completion: Drayton 1357, Cushing 1427, Lamson 1431.

At 1456 9 July, fueling of Lexington was completed. Lexington received 903,784 gallons from the Ramapo.

At 1515 9 July, the Lexington got underway for the search area in vicinity of Howland Island, accompanied by Drayton, Lamson and Cushing.

The timely arrival of the Ramapo and the prompt accomplishment of repairs to Cushing and expeditious delivery of fuel and provisions to destroyers by Fourteenth Naval District activities reduced the time necessary to be spent in the Hawaiian area to a minimum. This permitted the search to begin promptly as planned.

At 1630 9 July, Commander Destroyer Division Three was directed by Commander Destroyer Squadron Two to take command of the destroyers, and, upon signal, proceed and rendezvous with the Colorado in latitude 5° 50' N, longitude 173° 15' W, at 0700 zone plus 11½ time on Monday, 12 July, for the purpose of fueling. Upon completion of fueling destroyers were to proceed independently to take station for search operations arriving by 0600, 13 July. At 1630 9 July, signal was sent directing execution of the above.

The speed of the Lexington was set at 18 knots. At 1600 9 July, increased speed to 19 knots in order to reach point of origin - latitude 2-30 N, longitude 177 W - at daybreak on 13 July.

The following despatch was received from Commandant Fourteenth Naval District on 11 July 1937: 0011 COMDESRON TWO TAKE CHARGE OF UNITS IN SEARCH AREA PERIOD SEARCH OF PHOENIX GROUP AREA CONSIDERED COMPLETED PERIOD UPON COMPLETION FUELING DESTROYERS COLORADO RELEASED SEARCH DUTY AND PROCEED PREVIOUSLY ASSIGNED DUTIES FOLLOWING ITINERARY SUBMITTED COLORADO DESPATCH THE NINTH 0945.

II. CONDUCT OF SEARCH BY COMMANDER DESTROYER SQUADRON TWO:

At 1210 11 July, SWAN and ITASCA were directed to continue existing assignments until further orders and make routine reports.

During the conference with Commandant Fourteenth Naval District on 9 July, the possible necessity for search of the Gilbert Islands, British Territory, was considered. On 10 July, Commandant Fourteenth Naval District requested the Navy Department to obtain authority for an aircraft search of these islands. The estimate of the Earhart plane's probable location put her somewhere in an area including the Gilberts, so, on 11 July, Commander Destroyer Squadron Two specifically requested of Commandant Fourteenth Naval District authority for search of that area. Plans were laid for search of the area bounded by latitudes 3° N and 1° S, between longitudes 175° 30' and 178° 30' W and from latitude 3° 40' N to latitude 1° 40' S, between longitude 176° 30' W and 175° 30' E by Lexington aircraft and for search of individual islands of Gilbert Group by the Itasca and Swan. Itasca and Swan were directed at 2240 11 July, to stay course for Arorai and Onoatoa Islands respectively.

On 12 July, the destroyers Lamson, Cushing and Drayton made rendezvous with Colorado and fueled. The length of time required for fueling of each destroyer, and the amounts received by each were as follows:

Lamson	Time 2.3 hours	Amount 44,404 gallons
Cushing	Time 1.7 hours	Amount 41,499 gallons
Drayton	Time 2.5 hours	Amount 42,341 gallons

The Lexington's noon position on 12 July, latitude 5° 14' 45" N, longitude 173° 07' 15" W, course 228, speed 19 knots. The speed of the Lexington was reduced to 18 knots at 1015.

The Itasca continued search in direction of Arorai Island on course 267° T, speed about 12 knots. Noon position latitude 2° 33' S, longitude 179° 24' East. Visability about 15 miles. The Itasca was due to arrive off Arorai about 0100, zone plus 11½ time. Commandant Fourteenth Naval District was advised that the Itasca could reach Arorai on the morning of the 13th, and was requested to obtain the necessary authority as soon as possible.

The Colorado completed fueling destroyers about 1530 (zone time plus 11½ hours) and was then released from Earhart search Group to carry out remainder of her itinerary in connection with the Naval Reserves.

The destroyers proceeded to take plane guard stations in accordance with Search Plan No. 2 (Annex B), to arrive about 0600 13 July. Point of origin 2° 30' N, longitude 177 W. Cushing carrier plane guard, Lamson right flank guard.

At 1800 12 July, the Drayton reported casualty to throttle valve of her port high pressure turbine due to throttle disc of balance piston apparently backing off. This casualty reduced the speed of the Drayton's port engine to r.p.m., for 19 knots. The adverse weather conditions somewhat slowed up the fueling of destroyers and prevented the Drayton, which fueled last, from reaching station promptly 60 miles on port beam of Lexington as originally ordered in Search Plan No. 2. She was directed to lay course for Howland Island at speed of 19 knots to save distance and conserve fuel. By so doing she was able to reach the area of aircraft operations and see plane guard on Tuesday, 13 July as scheduled.

In the evening of 12 July the Navy Department advised that the State Department had been requested to make necessary diplomatic arrangements for aircraft search of the Gilberts. The Commandant Fourteenth Naval District informed the Navy Department that immediate authority was necessary because of fuel considerations. At midnight 12-13 July, the Itasca was directed to keep clear of the Islands until a visit was authorized. At 0600 13 July the necessary authority was obtained.

On the morning of 13 July, the Swan was searching as directed from a point 2° S 160° toward Onotoa Island, Gilberts, at most economical speed. At 0710 she was directed to proceed immediately to Nukunau, Peru, Tapetenea and Nonuti Islands in search of Earhart plane, conserving fuel, and be prepared to rendezvous with Lexington at 1500, 17 July in 1° S, 177° E.

On 13 July the Itasca was searching vicinity of Arorai Island. At 0700 she was directed to search Arorai immediately, followed by Tamana and Ceotoa, then proceed to northwest and north on western side of Gilberts group investigating Nonuti, Kurie, Maiana, Apia, Taritari and Marki, and obtaining available information at Tarawa, conserving fuel and reporting progress, and to be prepared to rendezvous with Lexington as acted for Swan.

On 13 July the Itasca searched Arorai and Tamana Islands and vicinity. Residents were contacted at Arorai and stated that they did not hear the plane nor had they seen any evidence of wreckage. The Itasca, by my 0013-1910 was ordered to proceed to Kurie-Apamama Islands in the Gilbert group; thence northward conducting complete search of uninhabited and such search of inhabited islands as deemed necessary, arriving at Taritari 13 July. According to the Sailing Directions all islands of the Gilbert group are inhabited; Tarawa and Teratari are ports of entry; that the District Government Headquarters is located at Tarotori, but it was found to be located at Tarawa.

The Swan was directed by my 0013-1855 to search Nukunau, Peru, Onatoa, Taputeouea and Nonuti Islands by the late afternoon of the 16th.

The above routes by the Itasca and Swan would make a complete search of the Gilbert group by surface craft. It might be possible that Mrs. Putnam and her navigator might have drifted to or landed on an island in this group, the prevailing current being westerly and wind SSE.

It was determined that the Itasca and Swan would reach Honolulu without refueling upon completion of their search of the Gilberts. This was verified by both vessels, the Itasca including Howland Island returning to Honolulu on her route. In the event it was found necessary to further include either of those two vessels in the search, their schedules were planned to facilitate a rendezvous with the Lexington on 16 or 17 July for refueling.

The Lexington reached point of origin latitude 2-30 N, longitude 177 W at 0636 13 July - which time was designated as zero hour for commencement of operations. Sixty planes were launched to search in east and west directions as indicated in Search Plan No. 2. First plane left ship at 6:16 a.m., and last plane was recovered at 10:18 a.m.

Heavy rains and squalls interfered with morning search by aircraft. In the afternoon 27 planes were launched at 1303 (last plane took off at 1310), but operations were abandoned due to bad flying conditions and the planes were ordered to land aboard the carrier. At 1356 the planes returned aboard (the last plane was landed at 1411). The approximate area between latitude 2° 30' N and 1° 5" S and between longitude 176° 35' W and 179° 10' W was covered with the exception of the immediate vicinity of Howland which was obscured by heavy rains.

At the end of flight operations, the Lexington proceeded to position latitude 1° 20' S, longitude 180° to commence flight operations on the morning of 14 July.

On 14 July the Itasca was searching enroute Kurie group, consisting of Kurie, Nanouki and Apamama Islands and was expected to arrive about noon 14 July zone plus eleven and one-half time.

The Swan contacted the chief resident at Nukunau and proceeded to Peru. Radio communication with Peru Island was established on 500 KCS with station ZCC operated by the London Mission Society. All contacts were negative.

With Lamson as left flank guard, Cushing carrier plane guard, and Drayton right flank guard, the Lexington commenced aircraft operations at 0730, and launched 42 planes in accordance with Search Plan No. 1 (Annex A). Point "A" (Plan One) was latitude 1° 20' S, longitude 180°, base course north. The condition of the sea was smooth and visibility good. All planes were landed aboard at 1121. The aircraft reported that they would scan any wreckage or boat if such had been afloat. The Lexington's noon position was latitude 0° 32' S, longitude 179° 59' E.

The second flight of aircraft commenced at 1345, with point "C" of Plan One as the origin of operations in latitude 0° 00° longitude 180° and base course north. As a matter of interest this is the first time a ship of the Navy operated in latitude 0° 00° and longitude 180°. 42 planes were launched. The aircraft were all landed aboard at 1742. The area covered was between latitudes 1° N and 1° 40' S and longitudes 178-30 West and 178-30 East. There were a few rain squalls in the western area so heavy as to cause some of the aircraft in those sections to fly around them. These areas were small and are indicated on the attached chart. The positions of the plane guards, 60 miles on each beam of the carrier are also shown. During the night, the positions of the destroyers Lamson and Cushing were interchanged so that the Lamson took over the carrier duty and the Cushing took station 60 miles on port beam for operations on Thursday 15 July. During the night all vessels of the search group were directed to use their searchlights for at least five minutes during each night watch. A distance of only 40 miles had to be covered during the night and stoorageway was maintained.

On 15 July, the Swan was enroute from Peru to Onata, arriving at the latter island about 1200. The Swan anchored here and sent a boat ashore to contact natives. The Earhart plane was neither seen nor heard. The Swan then proceeded to Taputeouea Island to arrive at daybreak on the 16th, maintaining stoorageway during the night.

The Itasca made negative contacts at Kurio and the neighboring islands. She headed for and arrived at Tarawa during the morning of the 15th. At Tarawa, the commanding officer of the Itasca was interviewed by the District Administrator who stated that there was no sign of the lost Earhart plane in Gilbert Islands. He further declared that the Gilbert Islands were well populated and that he maintained excellent communications with the islands in general and particularly those to the north. Taritari Island to the northward is a port of entry for inter-island steamers. The District Administrator requested the Commander of the Earhart Search Group to inform the Senior Administrative Officer at Ocean Island of the presence of U. S. vessels at the Gilberts. Commander Destroyer Squadron Two then sent a multiple radiotelegram to British Colonial officials as follows:

"RESIDENT COMMISSIONER OCEAN ISLAND AND
SENIOR ADMINISTRATIVE OFFICER TARAWA ISLAND.
ANY INFORMATION YOU MAY GIVE UNITED STATES VESSELS VISITING
GILBERTS IN SEARCH OF EARHART PLANE WILL BE APPRECIATED /s/
DOWELL, COMMANDING EARHART SEARCH GROUP."

The District Administrator at Tarawa replied that he would advise the Commander of the Search Group of any information or evidence received.

Upon completion of the contact at Tarawa the U. S. Coast Guard Cutter Itasca requested authority to proceed to Honolulu, via Howland, to relieve personnel. In view of the fact that the islands were well populated to the northward and communication maintained with the District Administrator at Tarawa, the Itasca was directed to proceed to Howland.

At 0719 15 July, the Lexington launched 41 planes in accordance with Search Plan No. One (Annex Afirm). Point of origin (Afirm) was latitude 1° 20' north, longitude 180°, base course north, the Lamson acting as carrier plane guard while the Cushing and Drayton were respectively left and right flank plane guards. At 1023 the planes returned from the morning flight.

At 1356 the afternoon flight of 41 planes took off from point "C" latitude 2° 35' N, longitude 180°. The planes returned at 1636.

The area covered for the day's search was between latitude 1° N to 3° 40' N and longitude between 178-30 West to 178-30 E. A few light squalls were encountered but the aircraft stated they could see through them fairly well. On the whole the search was considered satisfactory.

During the night of 15-16 July, the Lexington and plane guard destroyers proceeded to take stations for operations on the following morning. Drayton right flank, Cushing left flank and Lexington carrier duty.

On 16 July, the Swan investigated Taputeouea and Nonuti. This completed the search of the Gilbert Group of Islands by surface vessels with no sign of the lost Earhart plane. Upon completion of her task the Swan was released and directed to report to Commandant Fourteenth Naval District for further orders. She was directed to return to Pearl Harbor.

The Itasca was enroute Howland - 0800 position latitude 0114 north, longitude 175-38 east, course 90, speed 11 knots. In view of her longer experience with current and wind in the Howland area and her first hand knowledge of conditions since loss of the plane, the Itasca was asked to submit to Commander Destroyer Squadron Two her estimate of the most probable location of the Earhart plane - (DESPATCH) FROM COMDESRON TWO TO ITASCA 0014 ASSUMING THAT EARHART PLANE OR RUBBER BOAT STILL AFLOAT PLEASE SUBMIT YOUR ESTIMATE AS OF NOON TODAY MOST PROBABLE POSITION FIRST OF PLANE SECOND OF RUBBER BOAT 0910. The commanding officer of the Itasca replied: 0016 YOUR 1014-0910 ON ASSUMPTION GIVEN ESTIMATE MOST PROBABLE AREA ORIGIN LATITUDE 2 NORTH LONGITUDE 179-30 EAST THENCE LATITUDE 5 NORTH LONGITUDE 178-15 EAST THENCE LATITUDE 5 NORTH LONGITUDE 175-45 EAST THENCE LATITUDE 2 NORTH LONGITUDE 177 EAST THENCE TO ORIGIN PERIOD ESTIMATE BASED ON FOLLOWING CONDITIONS END OF FLIGHT CLEAR BLUE SKY SOUTH AND EAST OF HOWLAND HEAVY CLOUD BANK APPROXIMATELY 50 MILES NORTH AND WEST OF HOWLAND PERIOD ITASCA HAD LAID HEAVY SMOKE SCREEN FOR TWO HOURS WHICH HAD NOT DISINTEGRATED AND CLEARLY VISIBLE FROM SOUTH AND EAST FOR 40 MILES OR MORE AT ALTITUDE ONE THOUSAND PERIOD DOUBTFUL IF VISIBLE OVER 20 MILES FROM NORTH AND WEST COMMA SIGNAL STRENGTH AND LINE OF POSITION WOULD INDICATE EARHART RECKONING CORRECT AS FOR DISTANCE THOUGH SHE PROBABLY CARRIED LINE OF POSITION EAST BEFORE CIRCLING AND AFTERWARDS

PROBABLY FLEW NORTH AND SOUTH ON THIS LINE PERIOD HER REPORTS INDICATE HIGH FLIGHT WITH OVERCAST AND CLOUDY WEATHER AND EVIDENTLY FLYING IN CLOUDS UNTIL THE LAST FEW MINUTES OF FLIGHT PERIOD SIGNAL STRENGTH INDICATES MAXIMUM DISTANCE 250 PERIOD ESTIMATED PLANE DOWN WITHIN 250 MILES OF HOWLAND BETWEEN 337 and 45 TRUE AND NOT NEARER THAN 30 MILES PERIOD AT LATTER DISTANCE COULD NOT HAVE FAILED TO SEE SMOKE SCREEN IF SHE PASSED SOUTH PERIOD OUR EXPERIENCES SEA AND WIND DRIFT THIS VESSEL MAXIMUM ONE MILE 270 AND DOUBT IF PLANE OR LIFECRAFT WOULD EXCEED PERIOD ON THESE ASSUMPTIONS MOST PROBABLY AREA AS OF 1200 TODAY AS INDICATED ABOVE PERIOD EXCELLENT NAVIGATOR AND EXPERIENCE JUSTIFY ASSUMPTION PLANE DOWN ON LINE OF POSITION OR THAT LINE ADVANCED EASTWARD ONE HOUR ON LINE OF FLIGHT WHICH ASSUME WAS APPROXIMATELY 78 TRUE FROM LAE 1200.

As a matter of coincidence the probable area set forth in the above despatch from the Itasca was being searched by Lexington aircraft while these messages were exchanged.

The Itasca was released from further search duty at 1700, and was directed to report to Commandant Fourteenth Naval District who directed her to further report to Commander Hawaiian Section, U. S. Coast Guard. The latter instructed her to proceed direct to Honolulu from Howland.

At 0700 Lexington commenced flight operations from point of origin latitude 4° N, longitude 178° E, base course west, Search Plan No. 1, with planes searching in north and south directions. At 1042 all planes returned from the search and landed aboard carrier. Lexington's noon position latitude 3-59 N, longitude 177.00.7 E.

At 1255 afternoon flights of 40 planes took off and returned aboard at 1430. The area covered is approximately between latitudes 2-30 N and 5-30 N, longitudes 175-40 E and 179-20 E(see chart attached).

During the night of 16-17 July, the Lexington proceeded from 4° north 176° east east to take station, distance of 160 miles, for operations at 0700 on the 17th of July.

At 0658 17 July the Lexington commenced flight operations with point of origin at latitude 1° 00' north, longitude 175-40 E, base course east. 41 planes took off but only 39 participated in the search. Two planes returned aboard before commencing search. At 1012 landing operations were started. At 1017 4-B-8 experienced a barrier crash ending against one of the after turrets. No personnel were injured. At 1043 all planes returned aboard from the morning flight.

At 1259 on the afternoon of the 17th Lexington aircraft resumed flight operations with a total of 41 planes taking part in the search. Origin of operations latitude 1° 20' N, longitude 176-50 E, base course east; planes searching in north and south directions. At 1647 all planes landed aboard.

The areas searched on 17 July were between longitudes 175-10 E to 176-30 E, latitudes 0° 28' south and 2° 30' north; between longitudes 176-30 to 177-48 east, latitudes 0° 12' north and 2-45 north; between longitudes 177° 45' east to 178-16 east, latitudes 0° 12' north and 1° 18' north.

Through the San Francisco Division of the Coast Guard, Mr. George Palmer Putnam requested reconnaissance of the vicinity longitude 170° east, latitude 0° 09' north for the drifting plane. See ComFranDiv 0015-2335 and 0017-1234. The Commandant Fourteenth Naval District, in his 0017-1100 replied that it was impracticable to search area requested and that all the Gilbert Islands had been searched.

The Navy Department requested the Commandant Fourteenth Naval District, in its despatch 0017-2112, that before the termination of the search on 18 or 19 July practicability of covering the area 170° east longitude and 0° latitude. Commandant Fourteenth Naval District, in his 0017-1705, requested recommendations from Commander Destroyer Squadron Two in regard to the above search and asked whether or not the search group had sufficient fuel. Commander Destroyer Squadron Two, in his 0017-1944, stated that to comply with the Navy Department's desire it was necessary to proceed immediately at most economical speeds and that the remainder of the tentative plan as scheduled for the 18th would have to be abandoned. Further, for one days search it would require four additional days steaming to visit this area, and also there was a possibility of the Lexington requiring fuel at Lahaina instead of returning direct to San Diego as authorized in her itinerary (0017-0955 from Commandant Fourteenth Naval District to the Navy Department) and as required by Chief of Naval Operations 3800-0945 of July 1937. Commander Destroyer Squadron Two, in his despatch 0015-2045 and 0016-1727 had stated that the Lexington group was able to continue its present duty until 21 July if not ordered beyond limits 174° east, 1° south, thus enabling the Lexington to proceed on great circle to San Diego at speed 15, and for the destroyers to proceed to Pearl Harbor for fuel and provisions and thence to either San Diego or San Francisco.

Commander Destroyer Squadron Two considered the search of area 0° latitude, 170° longitude possible but not practical. During the evening of 17-18 July from 0800 to 2400 Lexington and destroyers steamed slowly on a westerly course awaiting instructions from Commandant Fourteenth Naval District. At midnight on 17 July the Earhart Search Group proceeded north to carry out the final days search in accordance with previous plans which would consist of searching areas covered by rain on 14-15 July and search additional area to the north-eastward. Commandant Fourteenth Naval District notified the Navy Department that it was impracticable to search the area longitude 170 E, 0° latitude as requested, and that it would not be searched unless otherwise directed by the Department.

At 0659 18 July, the Lexington commenced morning flight operations and passed point of origin (afirm) latitude 2° 55' N. longitude 177-48 E at 0714, base course 45°, Search Plan No.1. 41 planes were sent off. All aircraft returned aboard at 1036.

The afternoon flight operations commenced at 1300 from point "C", longitude 178° 45 E, latitude 3° 48' north, base course 45°. At 1648 all planes were landed aboard carrier.

The area covered during the morning search lies in the rectangles marked by the following points: from longitude 178° 30' E, latitude 1° 36' N to longitude 176° 28' E, latitude 3° 32' N, longitude 177° 22' E, latitude 4° 48' to longitude 179° 30' E, latitude 2° 38' N, along line of bearing 045° T.

During the afternoon the following was searched: From longitude 177° 35' E, latitude 4° 35' N to longitude 179° 38' E, latitude 2° 35' N; longitude 178° 30' E, latitude 5° 30' N to longitude 179° 30' E latitude 3° 30' N.

After the completion of the search on 18 July, the Earhart Search Group proceeded toward Hawaiian area, the Lexington enroute San Diego, course 052, speed 15 knots, via great circle course, passing near Oahu, and the destroyers Drayton, Lamson and Cushing enroute Pearl Harbor for fuel, provisions, and voyage repairs. The 2000 position on the 18th was longitude 179-52 W, latitude 5° 35' N.

The Drayton had been assigned restricted availability at Pearl Harbor Yard for repairs to port H.P., turbine throttle (Navy Department despatch 0017-1408).

The Lexington group reported to Commander-in-Chief, U. S. Fleet, for duty by Commander Destroyer Squadron Two despatch 0019-1100 from position longitude 176° 50' W, latitude 7° 14' N, at 1200 zone plus eleven and one-half time, giving as a tentative itinerary: (1) Lexington proceed direct San Diego; arriving 30 July 1937. (2) Commander Destroyer Squadron Two, in Lamson, Commander Destroyer Division Three in Drayton, and Cushing proceed to Pearl Harbor, arriving late 23rd or early 24th, fuel, provision and complete voyage repairs, depart 26th, arrive San Diego 1 August.

This itinerary was approved by the Commander-in-Chief, in his despatch 1119-1710, and the "Lexington Group" ordered discontinued as of the hour of hoisting Commander Destroyer Squadron Two pennant in Lamson.

At 1400 on 21 July Commander Destroyer Squadron Two hoisted his pennant in the Lamson and the search organization was terminated.

III. SUMMARY OF OPERATIONS.

The following summary is submitted showing the area in square miles searched by the Earhart search group since 11 July.

(a) Square miles covered by Lexington aircraft:

13 July	11,524 square miles
14 July	27,571 square miles
15 July	26,050 square miles
16 July	29,195 square miles
17 July	27,652 square miles
18 July	29,764 square miles
Total.....	151,556

During the time flight operations were in progress, the Lexington, Drayton, Lamson and Cushing maintained a lookout in addition to that kept by aircraft.

It will be noted in Search Plans One and Two that a destroyer was stationed as plane guard on each beam distant 60 miles. The third destroyer was 1,000 yards on the port quarter of the carrier.

In summarizing search operations, a ten mile front may be assumed for the Lexington and for the two plane guard destroyers on each beam. After search operations by aircraft were completed, there were still two to three hours of daylight steaming.

It was assumed that while acting as plane guard on the port quarter of the carrier the area searched by the destroyer there stationed would be included in the front searched by the Lexington.

(b) Area in square miles searched by

DATE	LEXINGTON	LAMSON	DRAYTON	CUSHING
12 July	2550	900*	600*	1680*
13 July	1480	1480	1480	Carrier duty
14 July	1440	1440	1440	Carrier duty
15 July	1440	Carrier duty	1440	1440
16 July	1520	" "	1520	1520
17 July	1440	" "	1440	1440
18 July	1650	" "	1650	1650
Total	11,520	3,820	9,570	7,730

* Destroyers fueled from Colorado thus limiting daylight search.

(c) ITASCA - Estimated ten mile front during daylight search.

DATE	SQUARE MILES	
11 July	1900	
12 July	1700	
13 July	500	Searched Arorai and Tamana Islands.
14 July	800	Searched Kuria, Nanouki Islands.
15 July	500	Enroute and visited Tarawa.
16 July	1900	Enroute Howland and released.
Total	7,300	square miles

(d) SWAN -

DATE	SQUARE MILES	
11 July	1100	
12 July	1000	
13 July	1000	
14 July	800	Visited Nukunau
15 July	800	Visited Peru & Onoto.
16 July	1000	Visited Taputouea & Nonuti.
Total	5,700	square miles

(e) Summary for surface vessels since 11 July -

Lexington	11,520	square miles
Lamson	3,020	" "
Drayton	9,570	" "
Cushing	7,730	" "
Itasca	7,300	" "
Swan	5,700	" "
Total by surface craft	45,040	" "

(f) Prior to 11 July, the following area, in square miles, is estimated by this command to have been covered during daylight by the Colorado and her two planes, the Itasca and Swan:

(1) By surface vessels:

Colorado 6-12 July	10,060
Itasca 2-10 July (inclusive)	29,130
Swan 5-10 July (inclusive)	9,950
Total	49,160

(2) By Colorado planes 15,925

(g) Final summary for all operations as determined by this command -

(1)	By surface vessels prior to 11 July	49;160
	By surface vessels 11-18 July	45;640
	Total by surface vessels	94,800
(2)	By aircraft - Lexington	151;556
	- Colorado	15;925
	Total by aircraft	167,481

(3) Grand total ..... 262,281 square miles, or the equivalent of a 500 mile square.

No sign nor any evidence of the Earhart plane was discovered.

SET AND DRIFT AS OBTAINED FROM THE NAVIGATOR USS LEXINGTON:

LATITUDE	LONGITUDE	SET	DRIFT
16 N	163 W	248°	0.6
12 N	166	270°	0.9
11½ N	167-16	296	1.8
9-46	169-15	252	0.4
6	174	180	0.8
3	176	097	0.5
1	177	353	0.9
0	178	276	0.6
1° S	180	238	0.9
0	180	None	
2 N	180	257	1.1
3	180	337	0.4
4	177 E	102	0.8
4	176 E	031	2.0
3	176 E	242	0.5
1	175½	295	0.8
1 *	176½	324	5.1
1½	177½	270	1.1
4	178½	262	0.7
3-45	176½	000	1.0
4	179	300	0.3

* Doubtful - believed to be error in D.R.

Vector average of final sixteen observations is 0.46 knots 314° true.

Lexington Group,
U.S.S. Lexington, Flagship,
Enroute Hawaiian Area,
20 July 1937.

From: Commander Lexington Group.
To : The Commandant, Fourteenth Naval District.

Subject: Report of Earhart Search, forwarding.

Enclosures: (A) Annex "A", Estimate and Decision, Condecree Two.
(B) Annex "B", Narrative of Search, Lexington Group.
(C) Annex "C": Aerological Data.
(D) Annex "D", Lexington Report of Earhart Search Operations.
(E) Appendix "A", Chart Photostat - Earhart Flight Information.
(F) Appendix "B", Chart Photostat - Track Chart Earhart Search, U.S.S. Lexington and attached aircraft.
(G) Appendix "C", Chart Photostat - The Earhart Search (Showing tracks of all vessels participating).
(H) Appendix "D" - Photostats - Search Plan #1, and #2.
(I) Appendix "E" - Earhart Search Plotting Sheet.

1. Annexes and appendices are submitted herewith as forming as complete a report as possible on operations of the Lexington group, consisting of Lexington with Aircraft Squadrons VS-2, VS-3, VS-4, VS-41, VT-2 and VB-4 embarked, of Commander Destroyer Division Three in Drayton, and Lamson and Cushing, during the period 4 to 18 July, 1937, inclusive, and of search operations of the U.S.S. Swan and U.S.C.G. Itasca while serving under Commander Lexington Group during the period 11-16 July 1937.

2. An effort has been made to confine the substance of this report to matters of fact rather than opinion.

3. Track chart tracings are being forwarded under separate cover.

4. The performance of duty by all units concerned was excellent.

The expeditious and efficient services rendered by the Fourteenth Naval District, the Fleet Air Base, Commander Minecraft, and Commander Submarine Squadron Six in preparation for the search operations, are greatly appreciated.

J. S. Dowell

AEROLOGICAL DATA

0000 - 1200 12 July

Overcast skies with heavy rain continued. Surface winds were East North East 23 to 33 knots. Winds aloft East North East 25 knots. Visibility was fair at times except during heavy showers. Alto Stratus and Cumulus were the predominating clouds. Ship's position 07° 15' N - 172° 09' W. Pressure 29.75. Temperature 79°, Humidity 89%, Sea Temp. 84°, Surface wind for one min. 0300 E.N.E. 19 knots.

1200 - 1600 12 July

Overcast skies with rain still prevailed at noon. 2 Alto Stratus with 8 cumulus. Surface winds were East NorthEasterly 20 to 25 knots. 81° humidity 88%. Sea Temp. 84° at 1450 rain stopped. Barometer began to fall rather rapidly dropping .07 to .08 in 3 hour period lowest barometer 29.68. Sky became broken with high and low scattered clouds. Visibility improved from fair to good.

1600 - 2000 12 July

Cloudy to partly cloudy skies, with intermittent moderate showers, cumulus building all the time, no anvil type cumulus were noted. Moderate shower occured at 1740 and lasted about 15 minutes, another shower at 2115 lasting 5 minutes, sky became broken closing in and becoming overcast at midnight; Shortly after mid-night a moderate shower occured lasting at least one-half hour. Sky broke and became partly cloudy with high and low scattered clouds Remaining broken until 0300. Flight operations were held shortly after 0600.

2000 12 July to 0300 13 July

Sky remaining cloudy with seven tenths of Cumulus and 3-tenths of Alto Stratus. Moderate rain squalls observed along the horizon at irregular intervals, with one of light intensity passing the ship 1745-1757. The Cumulus was lowering with very ragged under surfaces and accompanied with virga formation. Visibility good. Mostly undesirable flying weather. Surface wind steady at 18 to 19 knots from E.N.E.

0300 to 1600 13 July

Ship's position 01° 58N - 177° W. 4½ time.
Variable sky during the night with a large amount of high and intermediate clouds of all types. Frequent light and moderate squalls, both before and after midnight; times 2115 - 2138 (light) 0013 - 1142 (moderate). Upper clouds were prevalent while the lower types were well broken with occasional large spaces. Undersurface of low clouds was very ragged and associated with much virga. Visibility very good except reduced slightly during the Shower periods. Surface winds veered gradually during the night to south east. Velocity remained fairly constant at about 18 knots, but

fell off considerable after sunrise. Wind S3E 9 knots; Barometer 29.70. Temp. 81°; Humidity 88%; Sea Temp. 84°Dew point 77.

1600 13 July - 0000 14 July

Cloud amount remained constant all day but the lower clouds were variable, at times reducing to two and three tenths along the horizon. Frequent rain squalls intensity passing the ship at 1307 to 1347. Visibility very good, except reduced slightly during shower period. Winds were gentle E.S.E. and South Easterly, averaging 8-10 knots. Barometer 29.65. Temp. 84°, Humidity 73%. Dew point 74° and Sea Temp. 83°. Crossed equator at 1625 at 177 56 W. Long.

0000 - 1600 14 July

Ship's position 01° 11' S. 179° 59' E.
Variable sky during the night with intermediate fours and strato cumulus. Few cumulus continuing along the horizon. Cloudiness increasing slowly before 0800. Visibility very good throughout the night. Surface winds veering to the S.S.E. and S. decreasing in velocity to 5 and 6 knots, between midnight and 0400. Barometer 29.71, Temp. 81°; Dew point 74°. Humidity 79%. Sea Temp. 83°. Ocean Surface without swell, but slightly choppy due to wind influence.

1600 14 July - 0000 15 July

Frequent rain squalls during the period 0000-1600 with two passing the ship - one at 0834 - 0927 and 1307 -1343. Squalls were of moderate intensity and accompanied with increased gusty winds and reduced visibility Sky remained cloudy with the amount of lower clouds variable. The movement of the cumulus was rapid from the SE and variable amounts and variable size of clouds were crossing the field of vision during this entire period. Very good visibility except good during squalls. Temperature unsteady between 77° and 81°F. Barometer 29.65. Dew Point 74° F; Sea Temp. 83° F and Humidity 83%.

0000 - 1600 15 July

Ship's position 01° 38' N. 179° 55' W.
Variable cloudiness during the night with upper and lower clouds. Cumulus as before, continued to move across the field of vision in variable amounts and various size clouds. Frequent rain squalls were observed along the horizons, with one passing the ship at 0345-0415. A large well colored rainbow was observed at 0740. Visibility very good reduced slightly during the rain squalls. Mostly average flying weather - becoming undesirable at times, due to low clouds and showers. Surface winds variable at sunset, becoming SE, steady at 15 and 16 knots. Barometer unsteady at 29.70. Temperature steady at 79°; Dew point 73°, sea temp. 84° and humidity 83%.

1600 15 July - 1600 16 July

Variable cloudiness during the day with considerable high cloudiness. Some of the cirrus appeared to be false cirrus or the parts blown from

the tops of the cumulus. Frequent rain squalls were observed at varying distances from the ship with two passing the ship. One at 0006-0013 and a heavy squall from 1310-1330. The wind increased considerably during these squalls at times reaching 27 and 30 knots. Otherwise the surface wind remained fairly constant from the ESE and velocities at 17-20 knots. Pressure fell steadily all day but now leveled off at 29.63. Temp. unsteady above 80° and dropping below 80° at times of squalls. Sea temp. constant at 84°F. Humidity followed the regular variation, but average about 70%.

1600 16 July - 0800 17 July.

Partly cloudy skies with both high and low clouds CI and Alto Stratus predominating in early evening about 2000 the A ST dissipated and CI and CU remained throughout the night. One shower at 0320 to 0515. Visibility fair to good during entire period. Surface wind remained in ESE, 10 to 18 knots, winds aloft easterly 23 knots in lower levels. Barometer 29.65; Temp. 84° F.

0800 17 July - 1600 14 July.

Ship's position 06°56' N - 173°47' E.
Skies remained partly cloudy with A ST and CU predominating. Cumulus becoming well broken after midnight with clouds of various forms, drifting across the field of vision. Light to moderate intermittent rain squalls from 0300 - 0515. Surface wind remained in the E and ESE, averaging 17 knots with gusts to 26 and 27 knots during the squall periods. Visibility good and very good. Temp. 81°; reducing very slightly during the night. Dew point 74°, humidity unsteady 80 and 90%. Sea Temp. 84. Barometer 29.73. Barograph trace showed the regular diurnal change with no unusual fluctuations, except for a slight unsteadiness during the rain squalls, probably due to gusty winds.

1600 17 July - 0800 18 July.

Partly cloudy and cloudy skies entire day with cumulus predominating and high clouds of the CI, CIST and A ST forms visible to the south and east and increasing gradually after 0800. Light rain squalls visible at times in the distances to the SE. Visibility very good. Average flying weather. Barometer fell steadily in accordance with the regular diurnal change, now reading 29.64. Temperature very steady during the day at 82°. Dew Point 76°. Humidity unsteady between 80 and 86%. Sea. temp. remained constant at 84°.

0800-1600 July 18.

Ship's position 03° 06' N. - 177°29' E.
Partly cloudy to overcast skies, with much higher and intermediate cloudiness and with frequent passing showers and rain squalls after 0410 lasting until 0620. A distinct cold front passage occured at 0330, accompanied with .05 rise of the barometer, 3° drop in temperature, gusty winds and very heavy showers continuing until 0600. The shower from 0015 to 0620 was light and apparently a post frontal product. The weather

conditions at times other than the frontal passage are as follows: Barometer 29.80; temp. 83°; Dew point 76°; humidity unsteady between 86 and 90%. Surface wind steady between 16 to 20 knots from the east and ESE.

1000 to end of search, 18 July.

Sky condition reducing to partly cloudy and remaining constant throughout the day, with cumulus, predominating and a few tenths of intermediate and upper clouds visible to the East and South East. Very good visibility and with surface wind steady at ESE 15 to 17 knots. Barograph trace showed an unsteady trace during the day, now reading 29.65. Temp. unsteady at 82°7. Dew Point 76°. Humidity unsteady between 73 and 84. Sea temperature 84.

REPORT OF EARHART SEARCH OPERATIONS 3 - 18 JULY 1937

1. In accordance with despatch orders from the Navy Department and from Commander Aircraft, Battle Force, the U.S.S. Lexington departed from Santa Barbara at 1650, 3 July 1937, arriving at San Pedro at 2300, 3 July 1937. Preparations were begun to conduct a search for Amelia Earhart. Fuel and stores were received during the night. Upon completion of fueling at 0605, 4 July, the LEXINGTON departed for Coronado Roads to receive squadrons.

2. In the meantime, by order of Commander Aircraft, Battle Force, the following squadrons, which were temporarily based on shore, at the Naval Air Station, San Diego, California, made the necessary preparations for embarkation:

VS Squadron Two
VS Squadron Three
VS Squadron Forty-One
VS Squadron Forty-Two
VT Squadron Two
VB Squadron Four

Officers and men of these squadrons were recalled from shore leave and liberty. The planes were prepared to fly aboard and a lighter was loaded with baggage and spares.

3. The LEXINGTON arrived at Coronado Roads at 1048, 4 July 1937. The lighter with squadron personnel and baggage was immediately brought alongside and unloading was effected as rapidly as possible.

4. In compliance with OPNAV despatch 0004 - 1200, Captain J.S. Dowell, U.S. Navy, came on board the LEXINGTON and took command of the LEXINGTON Group which then consisted of the following vessels:

LEXINGTON
LAWSON
DRAYTON

The destroyers CUSHING and PERKINS were directed by Commander Destroyer Squadrons, Scouting Force, to fuel and provision at San Pedro and join the LEXINGTON Group later.

Mr. Paul Brock, International News Service Reporter, came on board the LEXINGTON in accordance with OPNAV despatch 1004 - 1322

5. The LEXINGTON, LENSON, and DRAYTON departed from Coronado Roads at 1258, 4 July 1937. The following squadrons with planes as indicated below were received on board the LEXINGTON.

SQUADRON	COMMANDING OFFICER	NO. PLANES	TYPE
VT-2	Lt. Comdr. Sinton	9	F3F
VS-2	Lieut. D.F. Smith	11	SBU
VS-3	Lt. Comdr. MacMahon	9	SBU
VS-41	Lt. Comdr. Taylor	14	SBU
VS-42	Lieut. Hoskins	9	SU-4
VB-4	Lt. Comdr. Rossell	10	BG-1
Lexington Utility	Lieut. (jg) Carver	1	OSU-3

One plane, No. 4-B-4 could not lower its hook and had to return to San Diego. This plane was accompanied by plane No. 4-B-7. Repairs to the hook were effected and both planes returned to the LEXINGTON. Lieut. (jg) George L. Hutchinson, U.S.N. developed serious illness and was transferred from the LEXINGTON to the Naval Hospital, San Diego, via the U.S.S. Chandler at 1620, 4 July 1937.

6. Due to engine trouble the destroyer PERKINS was unable to join the LEXINGTON Group, but the CUSHING joined about 10 miles south of China Point at 1845, and the Group proceeded to the Hawaiian Islands.

7. In accordance with CINCUS despatch 0105 - 1225 the Commander of the 14th Naval District was directed to assume charge of search operations.

8. The LEXINGTON arrived at Lahaina Roads at 1146, 8 July 1937 and the destroyers arrived at Honolulu the same day.

9. Captain Dowell and Captain Hayes of the LEXINGTON flew to Pearl Harbor via Fleet Air Base Patrol Plane for a conference with Commandant, 14th Naval District, regarding the conduct of the search.

10. All vessels were fueled to capacity and provisioned. In addition the LEXINGTON received about 11,000 gallons of aviation gasoline.

11. Mr. Charles Mounce of the United Press and Mr. Earl M. Tolty of the Associated Press came on board the LEXINGTON by authority of the Navy Department.

12. The LEXINGTON Group re-assembled and departed from Lahaina Roads for the Howland Island Area at 1515, 9 July 1937.

13. ANALYSIS OF PLANS FOR THE SEARCH

Manifestly it was not possible to search more than a limited area of the Pacific Ocean. Therefore, a study of all available information was made to determine the limits of the areas of probability. From the maze of information and mis-information, it was necessary to sift out that which was authentic and to base conclusions regarding the search thereon. The following facts were established: At about 0000 GCT, 2 July 1937, Amelia Earhart took off in a Standard Lockheed Electra Airplane from Lae, New Guinea, for Howland Island, distance 2227 nautical miles. She was accompanied by an experienced navigator, Mr. Fred J. Noonan. During the flight the plane was in communication with the Coast Guard Cutter Itasca, which was in the vicinity of Howland Island. The plane reported its position at 0720, GCT 2 July, 1937 at latitude 4°-33' South, Longitude 159-06, about 295 miles from Lae, which indicated that the plane was on its course but making good a ground speed of only 111 knots. The following radio reports were received from the plane by the ITASCA on 2 July 1937:

At 1745 GCT - 0615 Howland time, 15 minutes before the estimated time of arrival, the plane sent the following message:

"Two hundred miles out and no land fall"

At 1816 GCT - 0646 Howland Time:
"Approximately 100 miles from ITASCA, position doubtful".

At 1912 GCT - 0742 Howland Time:
"30 minutes gas remaining, no land fall, position doubtful".

At 1928 GCT - 0758 Howland Time:
"Circling, trying to pick up island".

At this time the radio signals from the plane received by the ITASCA were of greatest strength.

At 2013 GCT - 0843 Howland Time:
"On a position line 157 - 337 degrees". (This line may have been a sun sight or it may have been a radio bearing observed by the plane on the ITASCA and it presumably passed through Howland Island;

At 2025 GCT - 0855 Howland Time:
"Heading north and south", giving the same position as above.

This was the last authentic message received from the airplane.

14. Numerous radio messages were reported to have been received by various agencies, particularly amateur radio operators, which purported to give information received direct from the plane after it landed. Many of these messages were in conflict and many of them were unquestionably false. None could be positively verified. These messages were a serious handicap to the progress of the search, especially before the arrival of the LEXINGTON Group. Information was received from reliable sources which indicated that the airplane could send no radio message after landing on the water. Supposed receipt of radio messages sent by the missing flyers after they had landed, indicated that the plane was on an island or reef. As a result of some of these messages, the COLORADO, ITASCA, and SWAN were detailed to search the Phoenix Islands, thereby taking them away from the vicinity of Howland Island, which in the early stages of search, was the most probable area. After due consideration it was decided to concentrate the LEXINGTON Group search on the sea area. This decision was based on the assumption that the Earhart plane had landed in the water and that the survivors were afloat either with the airplane or in a rubber boat.

15. Two plans for searching the maximum possible area were formulated and are appended hereto. Search Plan I contemplated operations for an indefinite period. By using 2/3rds of the LEXINGTON planes, opportunity for rest periods and for routine checking of airplanes was afforded every third day. To search efficiently it was considered essential to keep the personnel and planes in excellent condition. About 7 or 8 hours per day was regarded as the maximum flying time that could be expected of personnel and yet have them remain on the alert while searching. Search Plan II was formulated in order that all the ship's airplanes could be used at one time and thus search the maximum area in any

given day. It was recognized that this plan could only be used for a single day and that at all other times Plan I above would have to be used. Both plans were similar in that they placed the planes on a scouting line on either side of the carrier, half on a side, with a scouting distance of 2 miles, and the search was extended 90 miles on either side of the carrier. In the case of Plan I, 42 planes were used, 21 on either side. The advance along the base course was dependent on the number of planes used. An extra plane on either side was used to provide an overlap in order to insure that no holiday was left between the leg out and the return leg. One destroyer was used at the carrier as plane guard for launching and recovering of planes. In addition it was available if needed for emergency rescue work near the carrier. The other two destroyers were stationed on either beam, 60 miles from the carrier on base course, for purpose of effecting rescue. The carrier was advanced along the base course at a speed which would intercept the planes returning from the search. With a destroyer on either flank; planes were never at a greater distance than 30 miles, measured normal to the base course, from the track of a ship. Based on available information it was decided, that the most effective altitude of the search was 300 - 500 feet and the most effective airplane speed was 90 knots. This was confirmed by experience during the search.

16. Information was obtained from the ITASCA, COLORADO, and SWAN to the effect that the average wind from the time of the end of the Earhart Flight until arrival of the LEXINGTON Group, was southeast 10 knots, and the current was westerly, average 5/10 knots. Since the missing plane had been down for about 11 days by the time of commencement of the LEXINGTON Group search, the area westward of Howland Island was chosen as the most probable area for the search. Since Howland Island was the destination of the Earhart plane and inasmuch as NOONAN was conceded to be an excellent navigator, it followed that the plane probably landed fairly close to Howland Island. The weather on the morning of 2 July was reported average and it is reasonable to assume that NOONAN obtained star sights during the early morning hours. A circle of 150 miles radius centered at Howland Island was selected as the probable boundary of the area in which the forced landing took place. This area could be expected to travel westward with the current and wind. If the survivors remained with the floating plane, the wind would have little effect but had they abandoned the plane and used the rubber boat, the effect of the wind would have been added to that of the current. No information was available on which to base an estimate of the effect of the wind on a rubber boat

but undoubtedly wind, if appreciable, would move a rubber boat at a comparatively greater speed than the current. After considering all features of the search it was decided to use Plan 2 (all planes) on the first day, and to search in the vicinity of Howland Island. The reason for searching Howland Island was that it was the destination of the Earhart Plane and if the search began on the extreme eastern limit and worked to the westward, it was believed that eventually a drifting plane or a rubber boat would be overtaken and further, that continuity of the search would thus be effected. Had the plane overshot Howland Island it was concluded that the drift would have taken it back to the westward and therefore no search east of Howland Island was deemed necessary.

17. On the morning of 13 July the LEXINGTON Group arrived at a point about 100 miles north of Howland Island and began the search. The weather was squally with wind velocity 22 to 28 knots and general flying conditions were undesirable. A search covering about 10,000 square miles however was made and the airplanes were recovered. In the afternoon about 27 planes were launched when rain squalls prevented further operations and made it necessary to recall planes already in the air. Even though this first day's search, due to the unfavorable weather, did not cover as great an area as was planned, it was decided to move further westward for the next days operation in order not to lose time in arriving at that was considered to be the most likely area. Current and wind experienced by the LEXINGTON Group confirmed the information previously received that drift of the floating plane or rubber boat would be definitely westward and at an appreciable rate. The wind on this day, and on all days of the LEXINGTON Group search, was stronger than expected, averaging about 18 - 20 knots.

18. Commencing 14 July and continuing up to and including 16 July, search Plan I was used. As a coincidence, the afternoon flight of 14 July began at Latitude 00-00 and Longitude 180°. On 14 and 15 July some interference was experienced due to rain squalls but in general the areas on these days were considered about 90 to 95 percent covered. Planes on the scouting lines approaching a rain squall necessarily had to divert their course somewhat to avoid dangerous flying conditions. Usually however, squalls were not very thick and the planes could easily pass through or around them. The

area covered by a heavy squall, of course, could not be searched but this had to be accepted as area lost in order not to delay advancing of the search. Figuring the drift, later search, on 17 and 18 July covered practically all of the area missed on those two days.

19. On 15 July the LEXINGTON encountered a current which gave a decided set to the northwest. Because of this and also the fact that the wind had been from south southeast force 3 to 4 since the beginning of the LEXINGTON Group search, it was decided to extend the search to the northwestward on 16 July. In general the wind and currents were greater in this northwesterly direction than expected. Weather conditions as regards rain squalls improved on the 16th and from this day until the end of the search, practically no area was left unsearched on this account. During the morning of the 16th an unidentified steamer was seen by the scouting planes in latitude 04°-38'N, Longitude 177°-32'E. This was the only vessel not a part of the search force which was sighted by the LEXINGTON Group. On this day the northern flank destroyer encountered definite northwesterly winds indicating that it was not necessary to extend the search further to the north.

20. Since the Sailing Directions and Chart indicated that breakers were reported in this area in 1914, on 17 July all pilots were instructed to look for shoal water. No reef or discolored water was sighted although the weather was clear and visibility was good which indicates that this shoal does not exist. On 18 July the search area was selected so as to include areas missed due to rain squalls on 14 and 15 July and to extend the search to the northwestward.

21. The last probable area having been covered upon completion of air operations in the afternoon of 18 July, orders were received to discontinue the search.

22. Appendix (A) is a chart of the last flight of the Earhart plane. Appendix (B) is a chart showing the area covered by the LEXINGTON Group search. Appendix (C) is a chart of the entire area searched by the Earhart Search Group. Appendix (D) consists of two diagrams showing the track of the carrier, destroyers and aircraft employed in Search Plans 1 and 2. These plans are similar except that more aircraft are employed by search plan 2, the flights are longer and the advance greater. A Flank Scout Commander was placed in charge of each Flank but it was found necessary to further divide each flank into three groups with a group leader immediately responsible

for his group. This facilitated passing around and through squalls and provided flexibility of the Scouting line. During the search operations the problem of recovering planes when squalls existed was a matter of considerable moment. Bearings were frequently taken of the windward squalls and it was found that with careful maneuvering of the carrier they could be avoided. Reports from airplanes of weather conditions to windward were also of value in this connection. By carefully timing the search, the start of which was announced by the flank commanders, the position of any given plane of the search could readily be determined at any instant. Radio bearings were frequently taken both by the planes on their loops and by the ship. These bearings served as a good check of their position. Radio bearings were also taken on the flank destroyers and were of material assistance to these destroyers in maintaining stations. Appendix (E) is a Plotting Diagram for tracking planes while on search.

23. The statistics below indicate the extent of the air operations during the search period 13 July to 18 July inclusive:

Area Searched - 151,556 square miles
Miles Flown - 143,242
Plane Hours in the Air - 1591.1

24. In general air operations were carried out smoothly. Communications were excellent. There was only one instance of radio failure of a plane, which resulted in that plane's elimination from one flight. There were two minor airplane accidents in which damage of material resulted. The more serious of these occurred when plane 4-3-8 failed to engage the arresting gear and the plane crashed into the barrier. The damage was such that a major overhaul is necessary. The second was occasioned by plane 2-F-13 landing off center to the left, which resulted in damage to the left lower wing and landing gear. No injuries to personnel occurred in either of these accidents.

25. Except for the comparatively small areas that were blanked out by rain squalls, the search was thorough, and it is the conviction of the aviators who did the flying that neither the Earhart plane nor the survivors were in the area searched. An estimate was obtained from the ITASCA, which vessel had had the most experience in the Howland Island area, of the most probable location of

the missing flyers on 16 July, if afloat. This estimate coincided with that of the LEXINGTON Group.

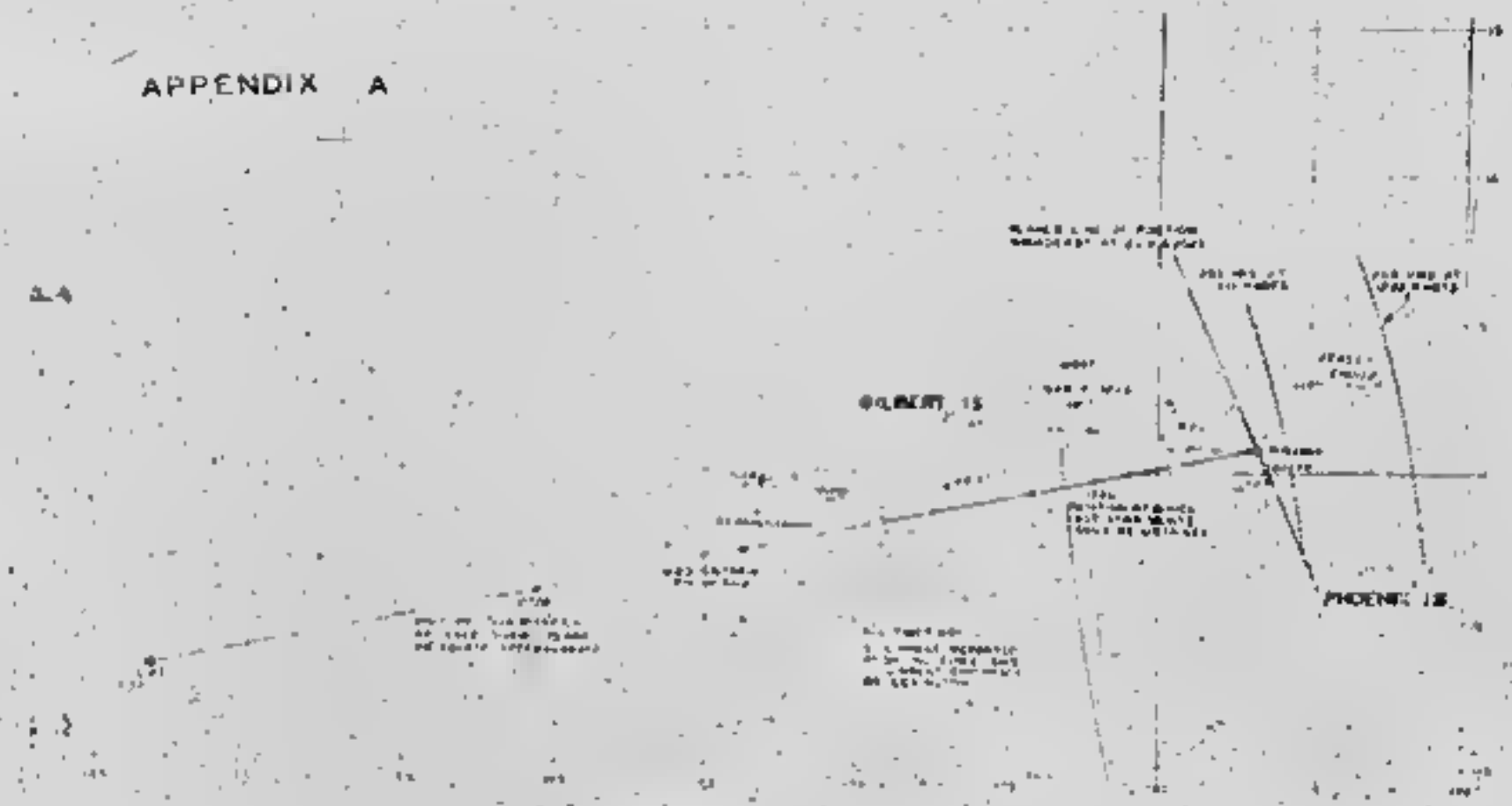
26. As a result of the experience of six days continuous flight operations, it is believed that the search plans devised are sound. The performance of personnel and material was satisfactory in all respects.

27. Although unfortunately the fate of the missing flyers remains a mystery, it is considered that the search made was efficient and that the areas covered were the most probable ones, based on the facts and information available.

Leigh Noyes.

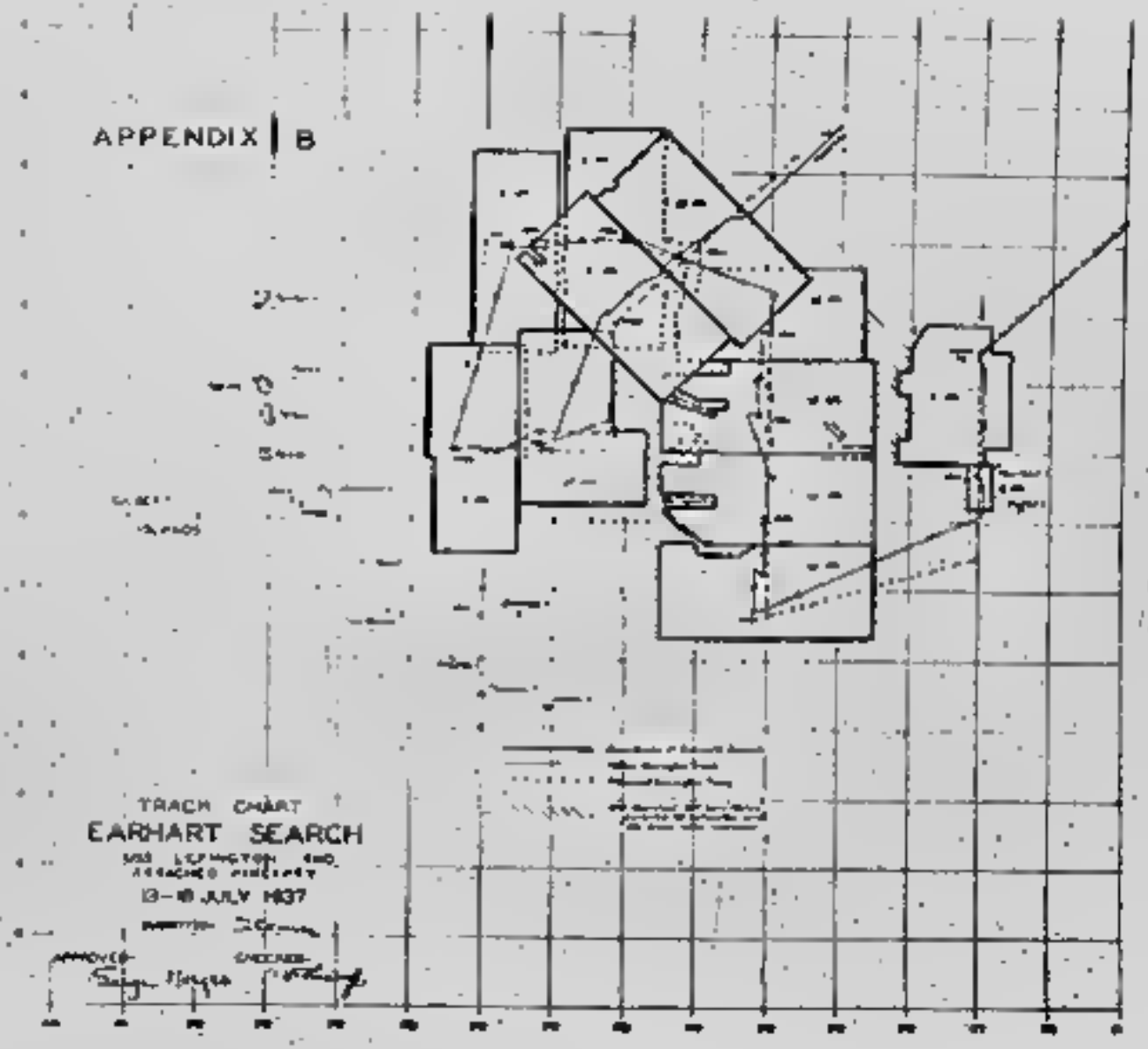
LEIGH NOYES
Captain, U.S. Navy,
Commanding, U.S.S. Lexington.

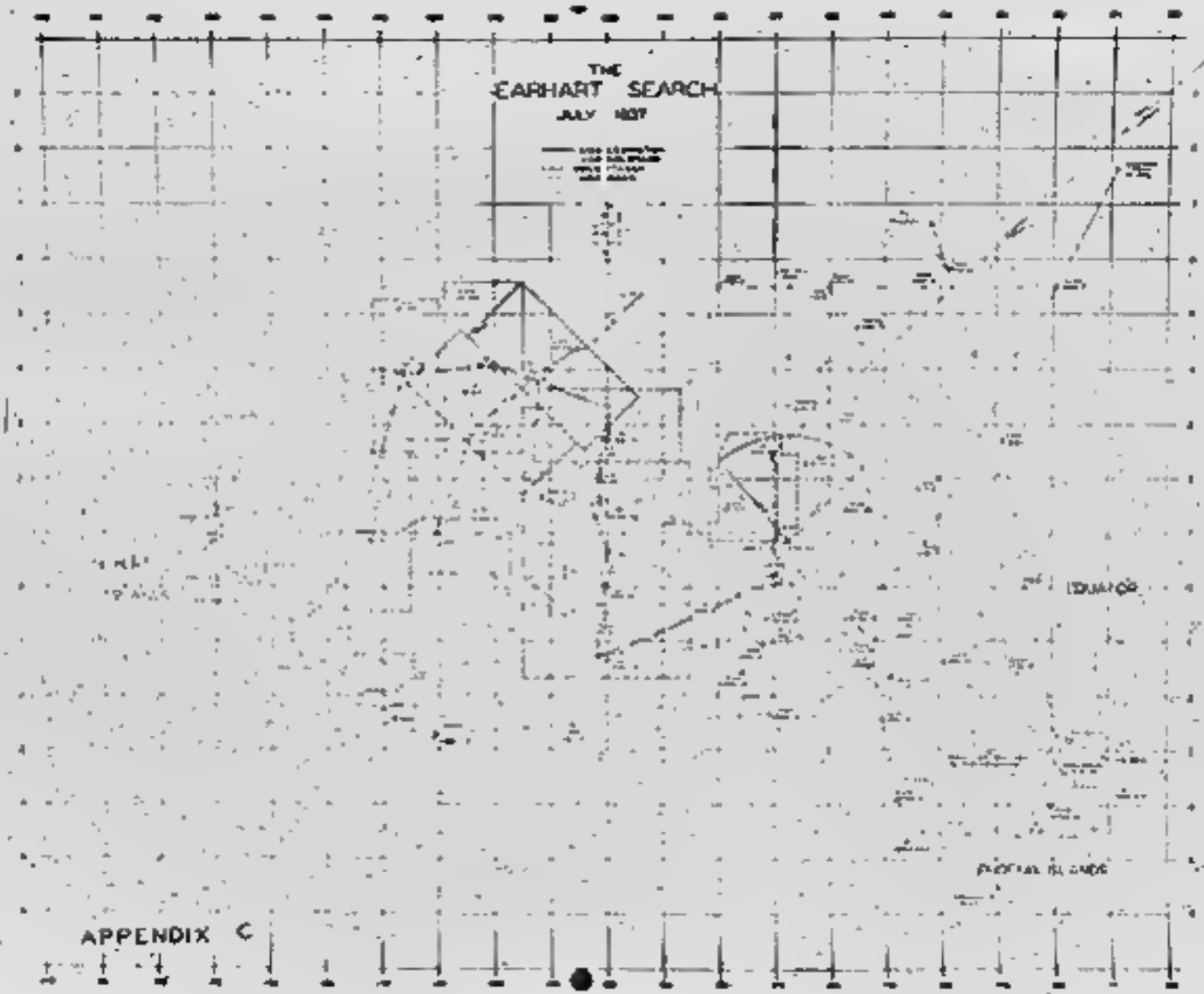
APPENDIX A



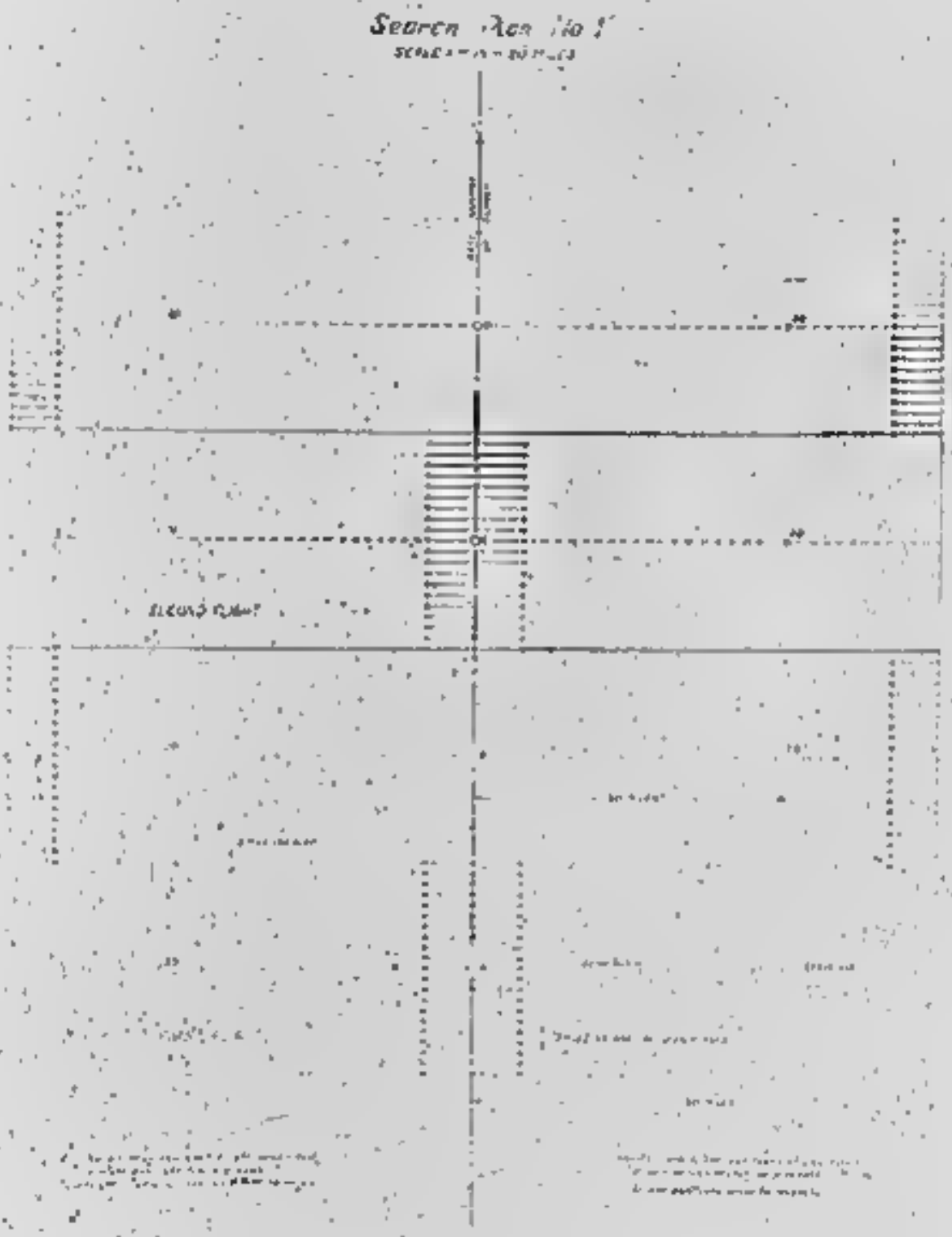
EARHART FLIGHT INFORMATION

APPENDIX B





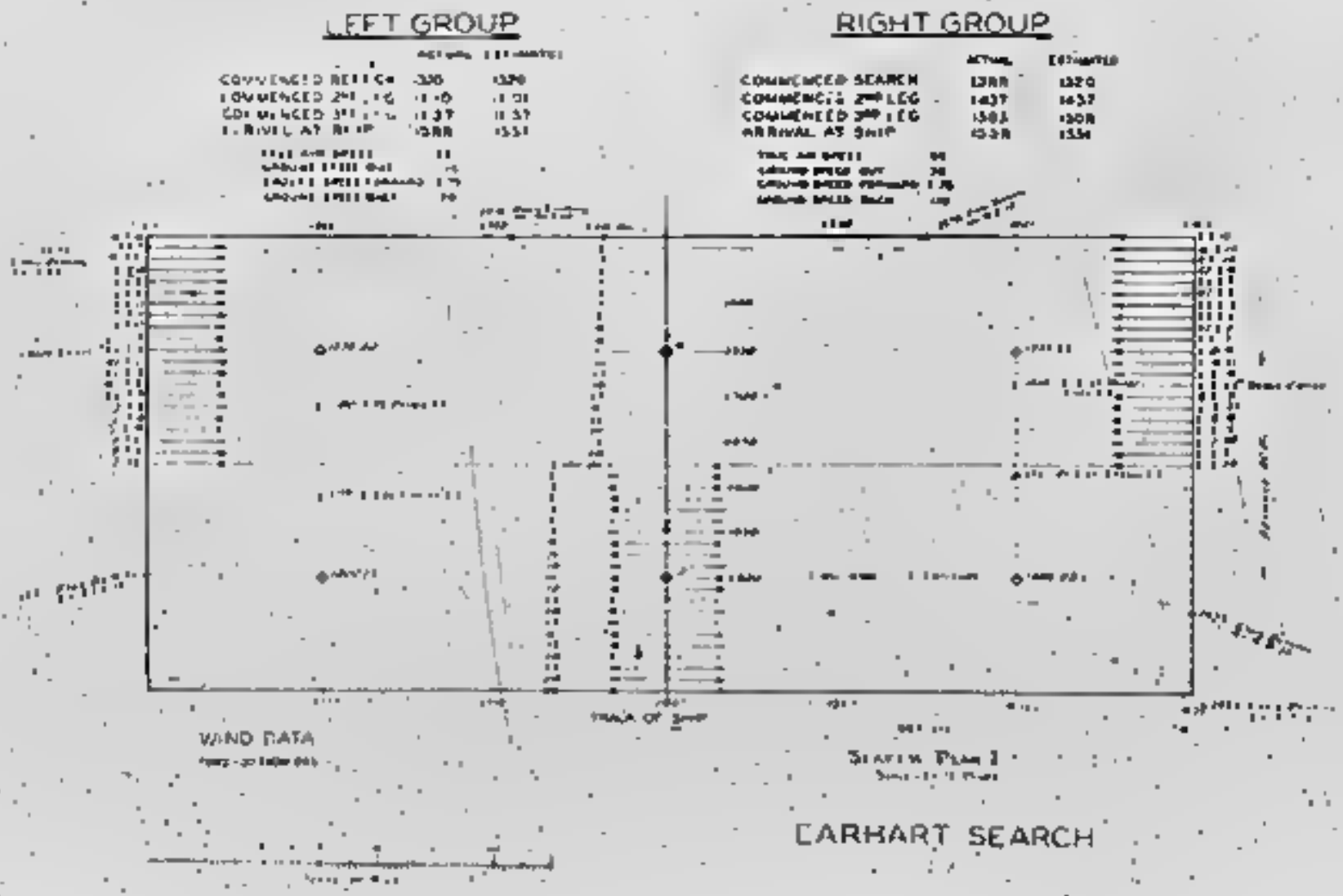
APPENDIX C



Appendix (D)

Appendix (D)

SEARCH PLAN 2


LEFT GROUP
RIGHT GROUP
WIND DATA
EARHART SEARCH
PLOTTING SHEET
AIR PLOT
USS LEXINGTON

APPENDIX E